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Siriraj Acute Stroke Unit : The Experience of 614 Patients

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Abstract :

Background : Stroke is a leading cause of mortality and morbidity worldwide. Establishing a stroke unit is one of the most recent advance in an acute stroke management. A number of trials have shown the benefit of stroke unit. In Thailand, the Siriraj Acute Stroke Unit (SASU) is the first and only unit in the country. It has been established since May 1997.

Methods : We analysed the data from the acute stroke patients admitted to the SASU from May 1997 to January 2001. The main criteria for admission to the SASU were stroke patients of either sex, aged over 13 years, with a Glasgow Coma Scale over 11/15, and those who did not require ventilation.

Results: The total number of patients admitted to the SASU was 614. There were 310 males (50.49 per cent) and 304 females (49.51 per cent). The mean age of all patients was 63.79 years (range 19 - 94 yrs). CT or MRI brain scans were done on 580 patients (94.46%). Stroke subtypes were classified as cerebral infarction in 488 patients (79.40%) and cerebral haemorrhage in 102 patients (16.61%). Fifteen patients (3.07%) were diagnosed with a transient ischaemic attack. Seven patients (1.14%) initially diagnosed as having a stroke were found to have a brain tumour (4 primary and, 3 metastatic tumours). Risk factors for stroke were as follows :- hypertension (57.32%), diabetes mellitus (30.94%), hyperlipidaemia (30.13%), heart disease (24.08%), and smoking (23.28%). The mortality rate of acute stroke patients in SASU was 1.95 percent (12 patients) mainly due to brain herniation (6 patients). The mean total hospital stay of stroke patients at the SASU was 15.64 days (ranging from 1-120 days).

Conclusion: The mortality rate of acute stroke patients in SASU was very low (1.95%). The main cause of death was brain herniation. The hospital stay in the SASU is reduced by half in comparison with a general medical ward. An acute stroke patient admitted to the SASU has a better chance of survival as well as a shorter length of stay.

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เรื่องย่อ : หน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราช : ประสบการณ์ของการรักษาผู้ป่วย 614 ราย
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ความรู้พื้นฐาน : โรคหลอดเลือดสมองทำให้เกิดอัตราการตายและพิการสูงในประชากรทั่วโลก การก่อตั้งหน่วยโรค
หลอดเลือดสมองเป็นความก้าวหน้าในการบำบัดรักษาโรคนี้ และมีข้อมูลจากการศึกษาวิจัยบ่งถึงประโยชน์ของ
หน่วยงานนี้ ในประเทศไทยได้มีการก่อตั้งหน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราช เป็นแห่งแรกและแห่งเดียวของ
ประเทศ ตั้งแต่เดือนพฤษภาคม พ.ศ. 2540

วิธีการศึกษา : คณะผู้วิจัยได้วิเคราะห์ข้อมูลของผู้ป่วยที่รับไว้รักษาในหน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราช
ระหว่างเดือน พฤษภาคม 2540 ถึง มกราคม 2544 เกณฑ์ในการรับผู้ป่วยมีดังนี้ อายุเกิน 13 ปี, รับทั้งสองเพศ, มีระดับ
ความรู้สึกตัวมากกว่า 11/15 ของ Glasgow Coma Scale และต้องไม่ใช้เครื่องช่วยหายใจ

ผลการศึกษา : มีผู้ป่วยทั้งสิ้น 614 รายที่ได้รับไว้ในหน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราช เป็นผู้ป่วยชาย 310
คน (ร้อยละ 50.49) และผู้ป่วยหญิง 304 คน (ร้อยละ 49.51) โดยมีอายุเฉลี่ยของผู้ป่วย 67.79 ปี (พิสัย 19-94 ปี).
ผู้ป่วย 580 ราย (ร้อยละ 94.46) ได้รับการตรวจคอมพิวเตอร์สมองหรือ เอ็ม.อาร์. ไอ. ผู้ป่วยโรคหลอดเลือดสมองแบ่ง
ย่อยได้เป็นผู้ป่วยหลอดเลือดสมองตีบหรืออุดตัน 488 ราย (ร้อยละ 79.40), เลือดออกในสมอง 102 ราย (ร้อยละ 16.61),
transient ischaemic attack 15 ราย (ร้อยละ 3.07). ผู้ป่วย 7 ราย (ร้อยละ 1.14) ที่สงสัยว่าเป็นโรคหลอดเลือดสมอง
แต่พบว่าเป็นเนื้องอกในสมอง (4 รายเป็นเนื้องอกปฐมภูมิ และ 3 รายเป็นเนื้องอกทุติยภูมิ) ปัจจัยเสี่ยงโรคหลอดเลือด
สมองที่พบ คือ ความดันโลหิตสูง (ร้อยละ 57.32), โรคเบาหวาน (ร้อยละ 30.94), ภาวะไขมันในเลือดสูง (ร้อยละ 30.13),
โรคหัวใจ (ร้อยละ 24.08) และการสูบบุหรี่ (ร้อยละ 23.28). อัตราตายของผู้ป่วยในหน่วยโรคหลอดเลือดสมอง
เฉียบพลันศิริราช พบต่ำมากเพียง 12 ราย หรือร้อยละ 1.95 ซึ่งสาเหตุส่วนใหญ่เกิดจาก brain herniation (6 รายหรือ
ร้อยละ 50). ระยะเวลาครองเตียงเฉลี่ยของผู้ป่วยเท่ากับ 15.64 วัน (ค่าพิสัยระหว่าง 1-120 วัน)

สรุป : อัตราตายของผู้ป่วยในหน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราชพบว่าต่ำมาก (ร้อยละ 1.95) และสาเหตุ
ส่วนใหญ่เกิดจาก brain herniation. ระยะเวลาครองเตียงผู้ป่วยในหน่วยโรคหลอดเลือดสมองเฉียบพลันศิริราช ลดลง
กว่าครึ่งหนึ่งของผู้ป่วยในหอผู้ป่วยอายุรศาสตร์ทั่วไป. ดังนั้นการรักษาผู้ป่วยในหน่วยโรคหลอดเลือดสมองเฉียบพลัน
ศิริราช จึงทำให้ผู้ป่วยมีโอกาสรอดชีวิตมากกว่าและใช้เวลาอยู่ในโรงพยาบาลน้อยกว่าในหอผู้ป่วยทั่วไป.

INTRODUCTION

Stroke is the third most common cause of death in most western population after coronary heart disease and cancer.¹ It is thus the commonest life-threatening neurological disorder, with resulting disability.² The burden of stroke on patients, their families, and society is correctly publicised in most developed countries. Stroke in the developing world is less well documented, and some data are not retrievable because of the language barrier or the limited dissemination of data collected. However, more than two-thirds of the world's population live in developing countries, and one of the consensus statements from the Asia-Pacific Consensus Forum on Stroke Management predicts that "In the next 30 years the burden of stroke will grow most in developing countries rather than in developed countries".³

Cerebrovascular disease or stroke is a leading cause of mortality and morbidity in many countries in Asia as well as the rest of the world.⁴ Stroke also accounts for a significant proportion of admissions to medical wards in Thailand.⁵ The recent publications of guidelines from a meta-analysis of clinical trials suggest that there are treatment strategies for optimising the management of patients with stroke.⁶⁻⁹ They include the establishment of a stroke unit as a treatment strategy for acute stroke patient.

A number of trials have shown the beneficial effects of a stroke unit on mortality, morbidity and improving functional outcome as well as reduction in the length of hospital stay.⁹ In Thailand, The Siriraj Acute Stroke Unit (SASU) has been established since May 1997, and it is the first and only unit in the country. We have thus analysed the data from the SASU to understand the experience of stroke management in a stroke unit of Thailand.

MATERIALS AND METHODS

The data from all patients admitted to the SASU within the first 45 months of the establishment of the unit (May 1997 to January 2001) were analysed using SPSS 7.0. The main criteria for admission of patients to the SASU were acute stroke patients (within 7 days of onset) of both sexes and aged over 13. All patients did not required artificial

ventilation and had a Glasgow Coma Scale over 11/15 on admission.

Age, sex, type of stroke, associated diseases and stroke risk factors of all admitted patients were analysed. Most of the patients were investigated with a complete blood count, blood chemistry profile, chest radiography, electrocardiography, and neuroimaging (CT scan or MRI). Some patients had neurosurgical intervention and/or transferred to the medical intensive care unit if they required ventilation or a marked deterioration in consciousness such as impending brain herniation or severe sepsis. All patients were treated by a well trained team of staff including neurologists, nurses and physical therapists from the first day of admission until the discharge. All deaths were investigated for the cause of death, (including the transferred patients to the intensive care unit and neurosurgical intervention patients), then the mortality rate was calculated. The duration of stay in the stroke unit, in addition to the complications of acute stroke such as pneumonia, urinary tract infection, sepsis and decubitus ulcer were recorded and analysed. Statistical analyses used simple descriptive analysis such as percentage, means and range as appropriate.

RESULTS

There were 614 patients admitted to the SASU during the first 45 month period. There were 310 males (50.49 per cent) and 304 females (49.51 per cent). The mean age of all patients was 63.79 (SD = 13.76) years ranging from 19-94 years. There was no difference in age distribution between males and females. CT or MRI brain scans were performed on 580 patients (94.46 per cent). Stroke subtypes were classified as cerebral infarction in 488 patients (79.40 per cent), and cerebral haemorrhage in 102 patient (16.61 per cent). Fifteen patients (3.07 per cent) were diagnosed with a transient ischaemic attack (TIA). Seven patients (1.14 per cent) initially diagnosed as stroke were found to have brain tumour (4 primary and 3 metastatic brain tumours). The location of the cerebral infarction and haemorrhage are shown in Figures 1 and 2.

Risk factors for stroke were as follow : hypertension (57.32 per cent), diabetes mellitus (30.94 per cent), hyperlipidemia (30.13 per cent), underlying heart disease (24.05 per cent) and smoking (23.28 per cent). All risk factors for stroke are shown

in Figure 3.

Associated heart diseases and carotid artery stenosis are tabulated in detail in Tables 1 and 2 respectively.

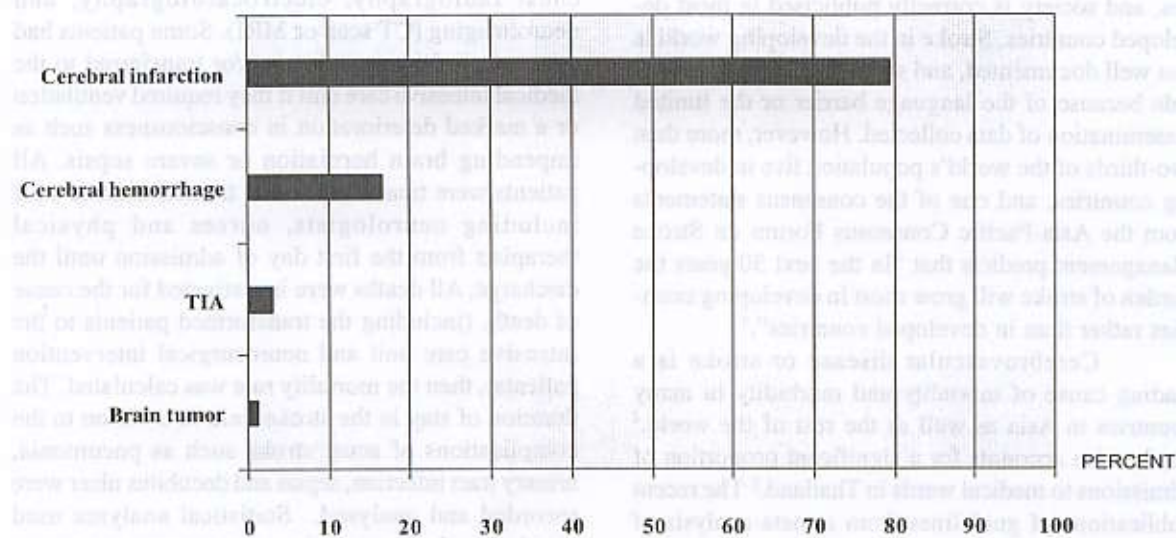


Figure 1. Type of stroke.

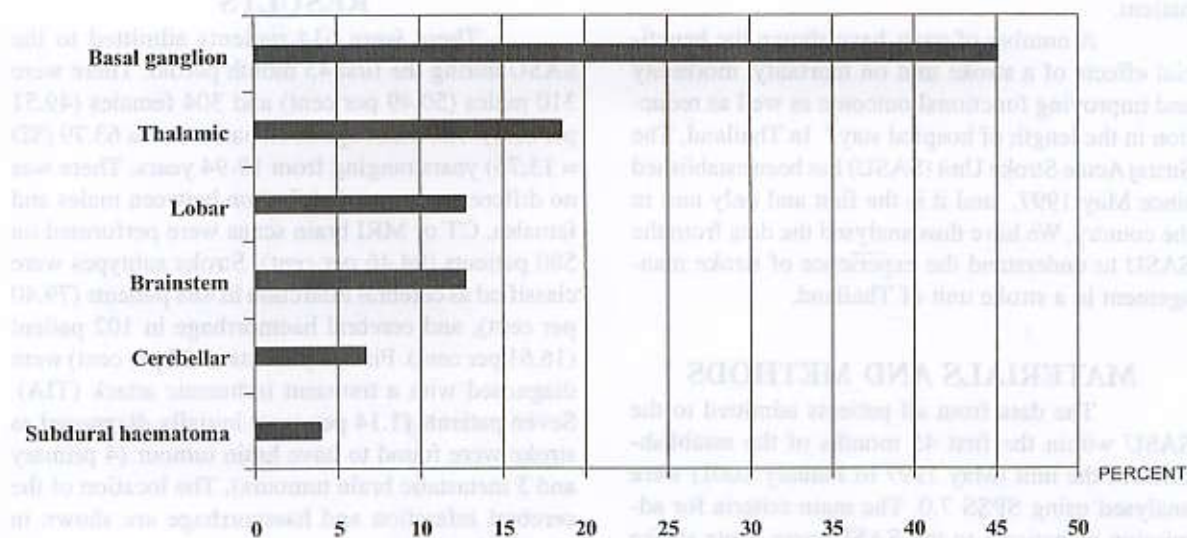


Figure 2. Location of cerebral hemorrhage.

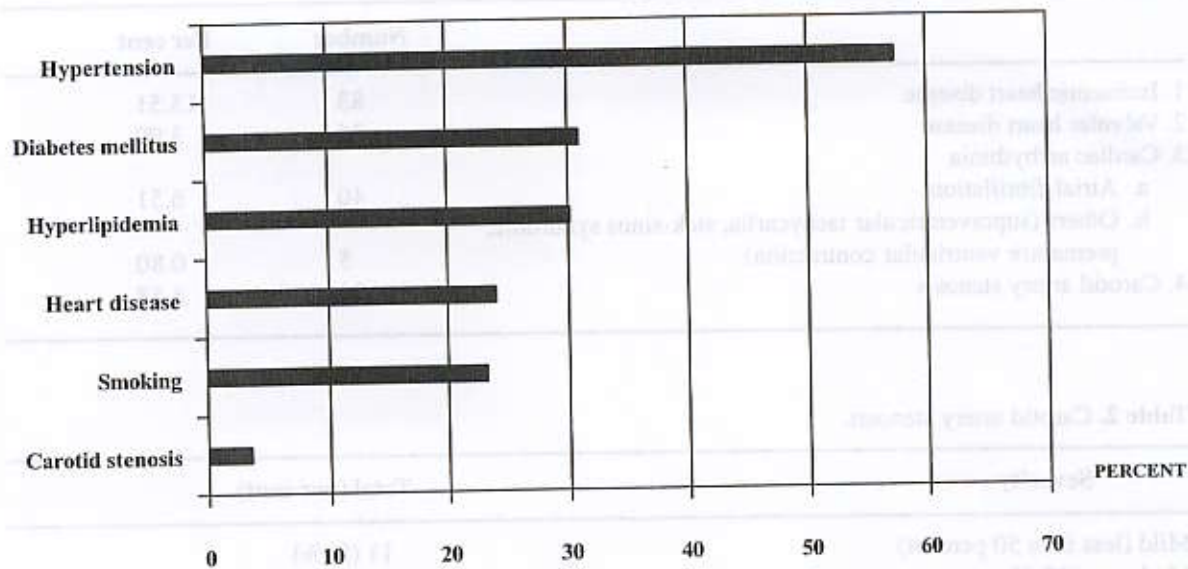


Figure 3. Risk factors for stroke.

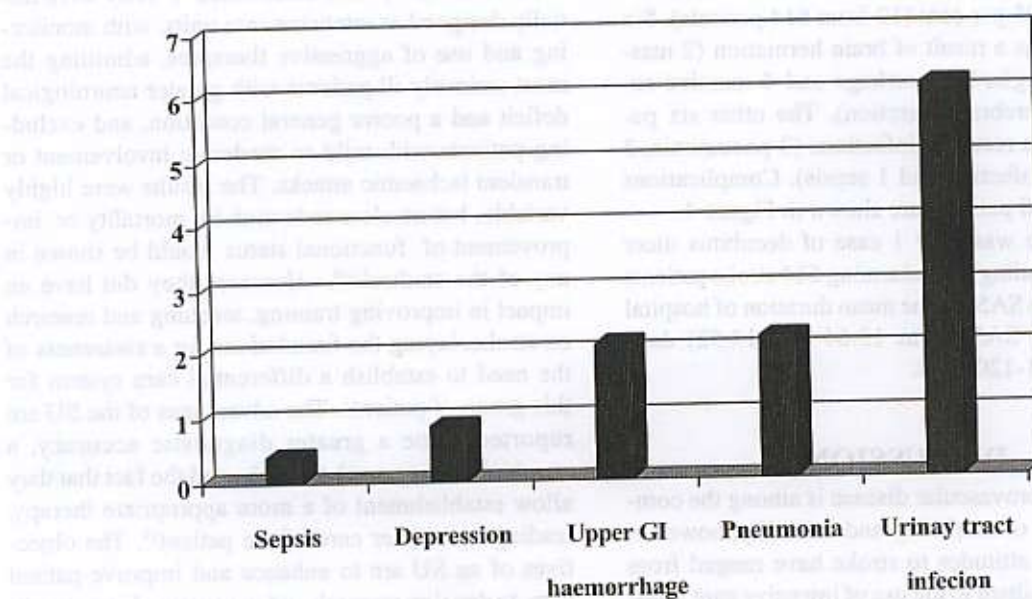


Figure 4. Complications occurring in patients admitted to the SASU.

Table 1. Associated heart diseases in 614 stroke patient.

	Number	Per cent
1. Ischaemic heart disease	83	13.51
2. Valvular heart disease	24	3.90
3. Cardiac arrhythmia		
a. Atrial fibrillation	40	6.51
b. Others (supraventricular tachycardia, sick-sinus syndrome, premature ventricular contraction)	5	0.80
4. Carotid artery stenosis	22	3.58

Table 2. Carotid artery stenosis.

Severity	Total (per cent)
Mild (less than 50 percent)	11 (50%)
Moderate (50-69 percent)	2 (9.09%)
Severe (70-79 percent)	9 (40.90%)

The mortality rate of patient admitted to the SASU was 1.95 per cent (12 from 614 patients). Six patients died as a result of brain herniation (2 massive basal ganglia haemorrhage and 4 massive supratentorial cerebral infarction). The other six patients died as a result of infections (3 pneumonia, 3 urinary tract infection and 1 sepsis). Complications occurring in all patients are shown in Figure 4.

There was only 1 case of decubitus ulcer (superficial grading) found among 614 stroke patients admitted to the SASU. The mean duration of hospital staying in the SASU was 15.64 (SD 13.52) days ranging from 1-120 days.

DISCUSSION

Cerebrovascular disease is among the commonest causes of morbidity and mortality; however, until recently, attitudes to stroke have ranged from therapeutic nihilism to the use of intensive care units, approaches which probably do not contribute to solving the problem¹⁰. In the early 70s, based on the good results obtained with coronary care units, the first

stroke units (SU) were established¹¹. They were initially designed as intensive care units, with monitoring and use of aggressive therapies, admitting the most seriously ill patients with greater neurological deficit and a poorer general condition, and excluding patients with mild to moderate involvement or transient ischaemic attacks. The results were highly variable, but no clear reduction in mortality or improvement of functional status could be shown in any of the studies¹¹⁻¹⁴. However they did have an impact in improving training, teaching and research on stroke, laying the foundations for a awareness of the need to establish a differential care system for this group of patients. The advantages of the SU are reported to be a greater diagnostic accuracy, a standardised approach to stroke and the fact that they allow establishment of a more appropriate therapy, leading to a better care of the patient¹⁴. The objectives of an SU are to enhance and improve patient care, to develop research and to promote better teaching and training both for the specialist and the staff responsible for the care of these patients. Based on these objectives, the concept of the SU changed, and

from the 80s, they are considered to be nonintensive acute stroke units, characterised by a systematisation in patient care, with trained staffs, preestablished admission criteria and special attention to the acute treatment and early functional and social rehabilitation of the patients. This requires a precise diagnostic and therapeutic routine. SU's are geographically confined structures, with specialised staff and diagnostic resources available 24 hours/day.

In recent years, the interest in SU has been renewed, mainly after the publication of different studies in which they have been compared to general medical wards, showing improved mortality, functional recovery and long-term hospitalisation rates. Although from the data published in 1985 and 1986, a shorter mean hospital stay and a reduced long-term hospital stay were found in patients treated in an SU, no changes were seen in mortality¹⁵⁻¹⁶. A statistically significant decrease in mortality at 6 weeks, shortening of the mean length of stay, better functional status on discharge and a reduction of long-term hospitalisation have been subsequently shown for SUs,¹⁷ and a significant saving in hospital costs based on the reduction of the mean stay have been noted.¹⁸ In the analysis of the follow-up at 5^{19,20} and 10 years,²¹ this lower mortality and better functional outcome have been shown to remain stable in the long term. We can therefore conclude that treatment in an SU makes a difference to the vital and functional prognosis of these patients, both in the acute stage and in the long term. Most of the stroke units within the systematic review were of moderate size (6 to 15 beds). Stroke units require medical, nursing, physiotherapy, occupational therapy, speech and language therapy and social worker input as a basic minimum²².

The Siriraj Acute Stroke Unit (SASU) has been established since May 1997. It had 11 beds, serving as nonintensive care unit and the criteria for admission to the SASU are defined as follows : a) acute stroke within 7 days of onset; b) does not require ventilation; c) a Glasgow Coma Scale over 11/15. Thus the SASU combines acute stroke treatment and rehabilitation. The main subtype of stroke patient admitted to the SASU was cerebral infarction (79.40%) and lacunar infarction of the supratento-

rial location was the most common site of pathology (51.5%). Risk factors for stroke patients in the SASU were similar to other studies, i.e. hypertension (57.32%), diabetes mellitus (30.94%), hyperlipidemia (30.13%), underlying heart disease (24.05%), and smoking (23.28%). TIA were recorded in only 15 patients (1.14%), and carotid artery stenosis was diagnosed in 22 patients (3.58%). These figures were much lower than the Caucasian population.

The mortality of stroke patients in the SASU was very low (1.95%) and the main cause of death was brain herniation (50%). Medical complications of patients in the SASU were recorded as follows : a) urinary tract infection (6%), b) pneumonia (2%), c) upper GI haemorrhage (2%), d) severe depression (0.8%) and e) sepsis (0.4%). Only one patient in the SASU developed bedsores or a decubitus ulcer, this emphasises the excellent team work of nursing staff and physical therapists who always encouraged all patients to mobilise at the very early stage, i.e. from the first day of admission.

The total hospital stay of stroke patients in the SASU was 15.64 days (ranging from 1-120 days) which was shorter than half the time spent by stroke patients on general medical wards²³. This is not surprising because we are aiming for this figure in advance as we are educating the patients' relatives or caregivers individually. We taught them early mobilisation, health education via videotape to demonstrate the proper care of a stroke patient at home, and to maintain normal activities of daily living such as eating, toileting, walking, sitting, dressing and getting out of bed independently.

We thus claimed the SASU to be the stroke management paradigm of Thailand as it is the first and only unit in the country. A stroke unit is now accepted as a standard means of treating acute stroke patients and it has proved as effective as treating stroke patients with a thrombolytic agent (tissue plasminogen activator) in term of reducing mortality and morbidity²². The cost of setting up a stroke unit is much cheaper than the cost of giving thrombolytic therapy to an acute stroke patient. We are thus encouraging the establishment of nonintensive stroke unit countrywide as a tool for acute stroke management in Thailand.

References

1. Warlow CP, Dennis MS, van Gijn J, et al. Reducing the burden of stroke and improving the public health. In: Warlow CP, Dennis MS, van Gijn J, et al, eds. *Stroke. A practical guide to management*. Oxford: Blackwell Science Ltd., 1996: 632-49.
2. Martin J, Meltzer H, Elliot D. OPCS survey of disability in Great Britain Report I: the prevalence of disability among adults. Office of Population Censuses and Surveys. London: Her Majesty's Stationary Office, 1988.
3. Pongvarin N. Stroke in the developing world. *Lancet* 1998; **352**(Suppl III): 19-22.
4. Pongvarin N for Asian Acute Stroke Advisory Panel (AASAP). Stroke epidemiological data of nine Asian countries. *J Med Assoc Thai* 2000; **83**: 1-7.
5. Viriyavejakul A, Pongvarin N. The incidence and mortality rate of 27,325 medical in-patients. *Siriraj Hosp Gaz* 1982; **34**: 501-10.
6. WHO Task Force on Stroke and Other Cerebrovascular Disorders. Recommendations on stroke prevention, diagnosis and therapy. Report of the WHO Task Force on Stroke and Other Cerebrovascular Disorders. *Stroke* 1989; **20**: 1407-31.
7. Adam HP, Brott TG, Crowell RM, et al. Guidelines for the management of patients with acute ischemic stroke. A statement for health care professionals from a special writing group of the Stroke Council, American Heart Association. *Stroke* 1994; **25**: 1901-14.
8. The European Ad Hoc Consensus Group. European strategies for early intervention in stroke. A report of an ad hoc consensus group meeting. *Cerebrovasc Dis* 1996; **6**: 315-24.
9. Langhorne P, Dennis M, ed. *Stroke units: an evidence based approach*. London: BMJ Books, 1998.
10. Biller J, Vove BB. Nihilism and stroke therapy. *Stroke* 1991; **22**: 105-7.
11. Kennedy FB, Pozen TJ, Gabelman EH, Tuthill JE, Zaents SD. Stroke intensive care - An appraisal. *Am Heart J* 1970; **80**: 188-96.
12. Drake WE, Hamilton MJ, Carlsson M, Blumkrantz J. Acute stroke management and patient outcome: the value of neurovascular care units (NCU). *Stroke* 1973; **4**: 933-45.
13. Norris JW, Hachinski VC. Intensive care management of stroke patients. *Stroke* 1976; **7**: 573-77.
14. Millikan CH. Stroke intensive care units. Objectives and results. *Stroke* 1979; **16**: 235-37.
15. Strand T, Asplund K, Eriksson S, Hagg E, Lithner F, Wester PO. A non-intensive stroke unit reduces functional disability and the need for long-term hospitalization. *Stroke* 1985; **16**: 29-34.
16. Strand T, Asplund K, Eriksson S, Hagg E, Lithner F, Wester PO. Stroke unit care-who benefits? Comparisons with general medical care in relation to prognostic indicators on admission. *Stroke* 1986; **17**: 377-81.
17. Indredavik B, Bakke F, Solberg R, Rokseth R, Haheim LL, Holme I. Benefit of a stroke unit: a randomized controlled trial. *Stroke* 1991; **22**: 1026-31.
18. Jorgensen HS, Nakayama H, Raaschou HO, Larsen K, Hubbe P, Olsen TS. The effect of a stroke unit; reductions in mortality, discharge rate to nursing home, length of stay, and cost. A community-based study. *Stroke* 1995; **26**: 1178-82.
19. Indredavik B, Shordahl SA, Bakke F, Rokseth R, Haheim LL. Stroke unit treatment. Long-term effects. *Stroke* 1997; **28**: 1961-66.
20. Jorgensen HS, Kammergaard LP, Nakayama H, Raaschou HO, Larsen K, Hubbe P, et al. Treatment and rehabilitation on a stroke unit improves 5-year survival. A community based study. *Stroke* 1999; **30**: 930-33.
21. Indredavik B, Bakke F, Shordahl SA, Rokseth R, Haheim LL. Stroke unit treatment. 10-year follow up. *Stroke* 1999; **30**: 1524-27.
22. Langhorne P, Dennis M. *Stroke unit: an evidence based approach*. London: BMJ books, 1998.
23. Viriyavejakul A, Pongvarin N. A comparative study of the duration of admission of private and ordinary medical in-patients. *Siriraj Hosp Gaz* 1982; **34**: 1001-5.